

*North Carolina.*—Charlotte, Fort Macon, Raleigh, and Statesville, 9th.

*Ohio.*—Jacksonborough, 8th.

*Oregon.*—Bandon, 4th, 25th.

*South Carolina.*—Stateburg, 2d, 9th; Pacolet and Spartanburg, 9th.

*Tennessee.*—Memphis, 8th; Nashville, 8th, 9th.

*Texas.*—Fort Elliott, 2d, 11th, 30th; New Ulm, Brownsville, and San Antonio, 12th; El Paso, 27th; Galveston, 29th.

*Washington Territory.*—Spokane Falls, 3d; Neah Bay, 17th.

#### OPTICAL PHENOMENA.

##### SOLAR HALOS.

Solar halos were observed in the various states and territories, as follows:

*Arkansas.*—19th, 20th.

*California.*—3d, 7th, 15th, 16th, 24th.

*Colorado.*—4th, 27th.

*Dakota.*—4th, 8th, 11th, 21st.

*Florida.*—20th, 21st, 23d, 28th.

*Georgia.*—6th, 17th, 28th.

*Illinois.*—2d, 3d, 5th, 7th, 22d, 26th, 27th.

*Indiana.*—18th.

*Iowa.*—2d, 6th, 7th, 9th, 13th, 24th.

*Kansas.*—7th, 9th, 19th, 24th, 31st.

*Louisiana.*—9th, 12th, 20th.

*Maine.*—1st.

*Massachusetts.*—4th.

*Michigan.*—8th, 12th, 13th, 20th, 21st, 26th.

*Minnesota.*—4th, 16th, 21st.

*Missouri.*—19th, 20th.

*Nebraska.*—19th to 24th.

*New Jersey.*—30th.

*New York.*—8th, 16th, 21st.

*Ohio.*—2d, 4th, 12th, 16th, 18th, 27th.

*Oregon.*—10th, 13th.

*Pennsylvania.*—17th.

*South Carolina.*—4th, 17th.

*Texas.*—10th.

*Vermont.*—8th.

*Virginia.*—4th, 10th, 17th, 23d, 30th.

*Washington Territory.*—30th, 31st.

*Wisconsin.*—2d, 3d, 7th, 10th, 14th, 21st.

*Wyoming.*—4th, 16th, 18th, 19th, 24th, 29th, 30th.

##### LUNAR HALOS.

Lunar halos were observed in the various states and territories, as follows:

*Alabama.*—17th, 19th, 20th, 22d.

*Arizona.*—15th to 18th, 20th, 21st, 22d, 25th.

*Arkansas.*—16th, 19th, 20th, 23d, 24th.

*California.*—15th, 16th, 17th, 19th, 20th, 24th, 30th.

*Colorado.*—11th, 16th, 18th, 22d.

*Connecticut.*—16th, 24th.

*Dakota.*—12th, 16th, 19th, 21st, 24th, 25th, 26th, 29th.

*Delaware.*—17th.

*Florida.*—1st, 17th to 22d, 24th.

*Georgia.*—17th to 21st.

*Illinois.*—5th, 11th, 15th, 19th, 20th, 22d, 28th.

*Indiana.*—9th, 15th, 17th, 19th to 22d.

*Iowa.*—15th, 23d, 24th.

*Kansas.*—2d, 12th, 15th, 17th to 24th, 26th.

*Kentucky.*—17th, 22d.

*Louisiana.*—15th, 17th, 19th, 20th, 25th.

*Maine.*—17th, 22d, 24th, 25th.

*Maryland.*—15th, 17th, 19th, 24th.

*Massachusetts.*—15th, 16th, 22d, 24th.

*Michigan.*—14th, 16th, 18th to 22d.

*Minnesota.*—12th, 16th, 17th, 19th, 20th, 21st, 27th.

*Missouri.*—19th, 20th, 23d, 26th.

*Montana.*—14th, 16th, 20th, 21st.

*Nebraska.*—12th, 16th, 19th, 21st to 24th.

*Nevada.*—18th, 20th, 22d, 24th.

*New Jersey.*—12th, 17th to 20th, 22d, 24th.

*New Mexico.*—25th.

*New York.*—15th to 18th, 20th, 21st, 24th to 28th.

*North Carolina.*—17th.

*Ohio.*—12th, 15th to 18th, 20th to 23d, 27th.

*Oregon.*—8th, 12th to 15th, 18th, 19th, 21st.

*Pennsylvania.*—12th, 15th, 16th, 17th, 20th, 21st, 24th, 25th.

*Rhode Island.*—24th.

*South Carolina.*—17th, 19th, 21st, 23d.

*Tennessee.*—17th, 18th, 19th, 21st, 22d, 23d, 28th.

*Texas.*—9th, 10th, 15th to 21st, 23d to 26th.

*Utah.*—18th, 21st, 24th.

*Virginia.*—17th, 21st, 23d, 24th, 27th.

*Washington Territory.*—14th, 15th, 20th, 27th.

*West Virginia.*—12th.

*Wisconsin.*—14th, 15th, 16th, 20th.

*Wyoming.*—14th, 17th, 18th, 19th, 21st, 24th.

The phases of the moon during December were: new moon, 6th, 8.10 a. m.; first quarter, 14th, 1.16 p. m.; full moon, 21st, 3.52 p. m.; last quarter, 28th, 7.16 a. m.; apogee, 10th, 4.30 p. m.; perigee, 22d, 8.12 p. m.

##### MIRAGE.

Sherlock, Finney county, Kansas: on the mornings of the 17th and 18th Garden City, about five miles distant from this place, and ordinarily invisible, being backed by a range of bluffs, was so plainly brought into view that the town seemed but a mile distant; the whole of each building was plainly seen.

Mirage was also observed at the following places:

Vermillion, Dakota, 15th.

Webster, Dakota, 19th, 21st.

Salina, Kansas, 22d, 24th.

Blue Hill, Massachusetts, 29th.

Marquette, Nebraska, 10th, 11th, 14th, 18th, 19th, 20th.

Harvard, Nebraska, 19th.

Cedar Keys, Florida, 23d, 27th, 28th.

Galveston, Texas, 13th, 14th.

Indianola, Texas, 9th, 18th, 19th.

Saint Vincent, Minnesota, 8th.

Duluth, Minnesota, 15th.

Sherburne, Minnesota, 19th.

#### MISCELLANEOUS PHENOMENA.

##### SUN SPOTS.

Prof. David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for December, 1885:

Date— December, 1885.	No. of new.		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
2, 3 p. m.							1	15†	
3, 1 p. m.	0	0	0	5†	0	0	1	10†	
6, 11 a. m.	0	0			0	0	0	0	
7, 11 a. m.	0	0	0	0	0	0	0	0	
8, 10 a. m.	2	4	0	0	0	0	2	4	
11, 9 a. m.	2	7†					3	10†	
12, 3 p. m.	0	0	0	0	0	0	2	5	
15, 10 a. m.							2	15†	
17, 4 p. m.	0	0	0	0	0	0	2	10†	
20, 10 a. m.	1	2	0	0			4	12†	
22, 1 p. m.	0	0	0	0	0	0	3	10†	
24, 11 a. m.	4	20†					7	30†	
25, 4 p. m.	0	0	1	3	0	0	5	20†	
29, 1 p. m.							3	50†	Spots mostly small.
30, 4 p. m.	0	0	0	0	0	0	3	40†	Do.

Faculae were seen at the time of every observation.

† Approximated.

Mr. H. D. Govey, of North Lewisburg, Champaign county, Ohio, reports having observed sun spots on the following dates: 4th, 7th, 14th, 16th, 18th, 21st, 25th, 26th.

##### SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty stations show 4,923 observations to have been made, of which three were reported doubtful; of the remainder,